

## TECHNICAL BULLETIN – TB168

# CERAMIC TILING WITH OPTIMA, ISOFLEX AND ARDEX X56 ON PARTICLEBOARD\PLYWOOD SHEET TIMBER FLOORING

Date: Monday, 16 April 2012

### INTRODUCTION & SCOPE

The key to success, when installing ARDEX tiling adhesive products is to achieve a good bond between the sheet timber substrate (i.e. particleboard) and the floor covering. Proper preparation of the surface is the most important factor in achieving this bond.

The surface, therefore, must be sound, clean and free of oil, grease, wax, dirt, old tile, vinyl or carpet adhesives, asphaltic underlayments, dust, finishes, paint or any contaminant which might act as a bond breaker.

### QUALIFICATIONS

- 1) **This recommendation only applies to:**
  - a. **internal timber floors and not to any external decking or verandah**
  - b. **domestic applications and light commercial such as small shops and industrial unit offices.**
- 2) The types of timber that the subfloor is made from must be certified as correct for flooring (strip edged particleboard and structural plywood).
- 3) Floors covered with hardboard strip timber or MDF sheet are not acceptable surfaces.
- 4) Moisture sensitive and natural stone tiles require special consideration and may be subject to Technical Bulletin TB010 recommendations.
- 5) This bulletin does not cover the installation of thin (3-4mm thick) large format porcelain sheet tiles onto timber floors.
- 6) This bulletin does not cover wet area floors subject to waterproofing requirements in AS3740 and the BCA.

### STRIP TIMBER SUBSTRATE (PLANKS)

Whilst direct bond to strip timber is possible in many cases, there is a significant risk associated with tiling directly to a strip timber floor. Ardex recommends sheeting the strip timber floor area with fibre cement sheet underlay prior to tiling. Where the timber floors require leveling prior to fibre cement sheeting, please refer to Ardex Technical Bulletins TB110 or TB015/TB016 for more information.

### STRUCTURAL CONSIDERATIONS

Owners must take responsibility for the long term and short term stability of the flooring system and tilers need to confirm that the floor is suitably rigid for tiling themselves.

The subfloor should be solid and fixed to provide a rigid base. Any boards exhibiting movement should be re-fixed, preferably with screws, and remedial work may involve fitting additional framing to stiffen the floor, or by covering with fibre cement sheeting.

Subfloors such as in mobile homes are likely to undergo large deflections, should be sheeted with fibre cement sheets, before fixing tiles.

Where the floor is to be fibre-cement sheeted, they shall be ceramic tile underlay sheets of a type specified to be used in this application by the sheet manufacturers. In other words, substituting wall or façade sheets for the correct underlay sheet is not



acceptable. The sheets shall be installed in strict accord with the manufacturer's recommendations.

Note fibre-cement sheeted floors may be subject to Ardex Technical Bulletin TB218 recommendations instead of these recommendations.

AS3958-2007 stipulates a maximum deflection movement of 1 in 360 of the span distance, dependent on the size of the tile to be adhered, however this may be insufficient for large format tiles and a higher degree of stiffness is recommended when using larger tiles.

<b>Floor Joist Centres Spacing → Tile size ↓</b>	<b>300mm</b>	<b>400mm (~16")</b>	<b>450mm</b>	<b>600mm (~24")</b>
<b>&lt;350mm edge length (medium format)</b>	1/360 0.8mm	1/360 1.1mm	1/360 1.3mm	1/360 ≤1.5mm
<b>&gt;350mm edge length (large format)</b>	1/500 0.6mm	1/500 0.8mm	1/500 0.9mm	1/500 1.2mm

Note: Whilst 1/360 of 600mm span is 1.7mm, the maximum shear recommendation is 1.5mm or less.

There is no standard test for this, but it is recommended that the floor be loaded with an 80kg weight to simulate an 'average' person (figure based on those for 19yrs males in the United States National Health and Nutrition Examination Survey, 1999–2002). This can easily be simulated by placing four 20kg bags of adhesive on the floor next to the straight edge. A feeler gauge or rule can be used to measure the gap under the straight edge. Where the measured floor deflection exceeds the maximum values listed above, the floor is deemed to be too flexible for these adhesives and requires other forms of stiffening.

#### **JOINTS IN THE TILING SYSTEM**

The installation of movement joints in the tile surface must comply with the recommendations in the ceramic tiling standard AS3958.1-2007.

Movement joints in tiled floors are installed to separate the tiled surface from fixtures such as columns and walls (all wall-floor junctions must have perimeter joints installed to isolate the tiled surface from the wall), subdivided large areas of tiled surface into smaller sections to allow for induced strains (the recommended areas are specified in the standard), and to interrupt the tiled surface where subfloor construction and movement joints are positioned.

#### **MOISTURE**

Timber floors must have excellent underfloor ventilation to eliminate water condensation. Underfloor moisture levels must be stable during the life of the flooring system with effective cross flow ventilation.

Free water sources must not be allowed under timber floors otherwise dimensional stability of the flooring will be compromised. It is not feasible to use a 'moisture barrier' to isolate an installation from moisture coming through a timber subfloor. Installing such a barrier is likely to lead to failure of the subfloor itself due to rot. Dampness also encourages vermin and termites.

Where moisture is found to be a problem this must be corrected by other means before any tile systems can be installed.

#### **AUSTRALIAN STANDARD**

- The relevant standards for framed construction where timber flooring is most likely to be used are:



- AS1684 - 1999, Residential Timber Frame Construction
- AS/NZS 1859 (Particleboard)
- AS3958.1-2007, Guide to installation of Ceramics Tiles.
- AS1170.1 (2002). Structural Design Actions Part 1 Permanent, Imposed and other Actions

**PARTICLEBOARD\ PLYWOOD SUBSTRATE**

Installer must ensure the particleboard surfaces are not contaminated with manufacturing resins, coatings or stains. Such contaminated surfaces shall be sanded with a 24 grit paper and vacuumed. Newly installed particleboards surfaces must be thoroughly cleaned to ensure dust free surface, but not necessarily sanded.

A bond breaker tape shall be used between the sheet joints and the adhesive bed.

*PRIMING*

Proper application of primer is crucial to the integrity of the tile installation in the long run.

Applying the primer as recommended helps optimize the adhesion strength to the timber substrate. Method of application and conditioning of the recommended primers as described below;

- Mix 2 parts of Ardex Optima powder to 1 part of Optima liquid. Add optima powder to the liquid whilst stirring with a mechanical mixer. Stir until both parts are homogeneously mixed. Apply Optima slurry with a sponge roller leaving a thick coat of Optima slurry over the timber substrate. Allow the slurry coat to dry fully before tiling over.
- Ardex 82 Ultraprime primer should be applied as recommended with a short nap or sponge roller leaving a thin coat of primer, no heavier than thin coat of paint to a transparent pink film over timber substrate. For optimum adhesion, the tile adhesive should be in contact with primed surface whilst primer is wet or tacky. To avoid walking on wet primer areas should be done in stages.

**TILE ADHESIVE SYSTEM INFORMATION**

Tile Adhesive	Primer	Recommended minimum drying times of primer prior to tiling (minutes)	Minimum Adhesive bed Thickness (mm)
X56 / 2 Part Isoflex	Optima Primer	40*	X56 – 2-2.5mm 2P Isoflex – 5mm
	Ardex P82	0	
Optima	Optima Primer	40*	2mm
	Ardex P82	0	

\* minimum drying time based on 20°C, 50%RH

\*\* Remove P82 primer from the substrate by mechanical methods, if drying time has exceeded 24 hours after application.

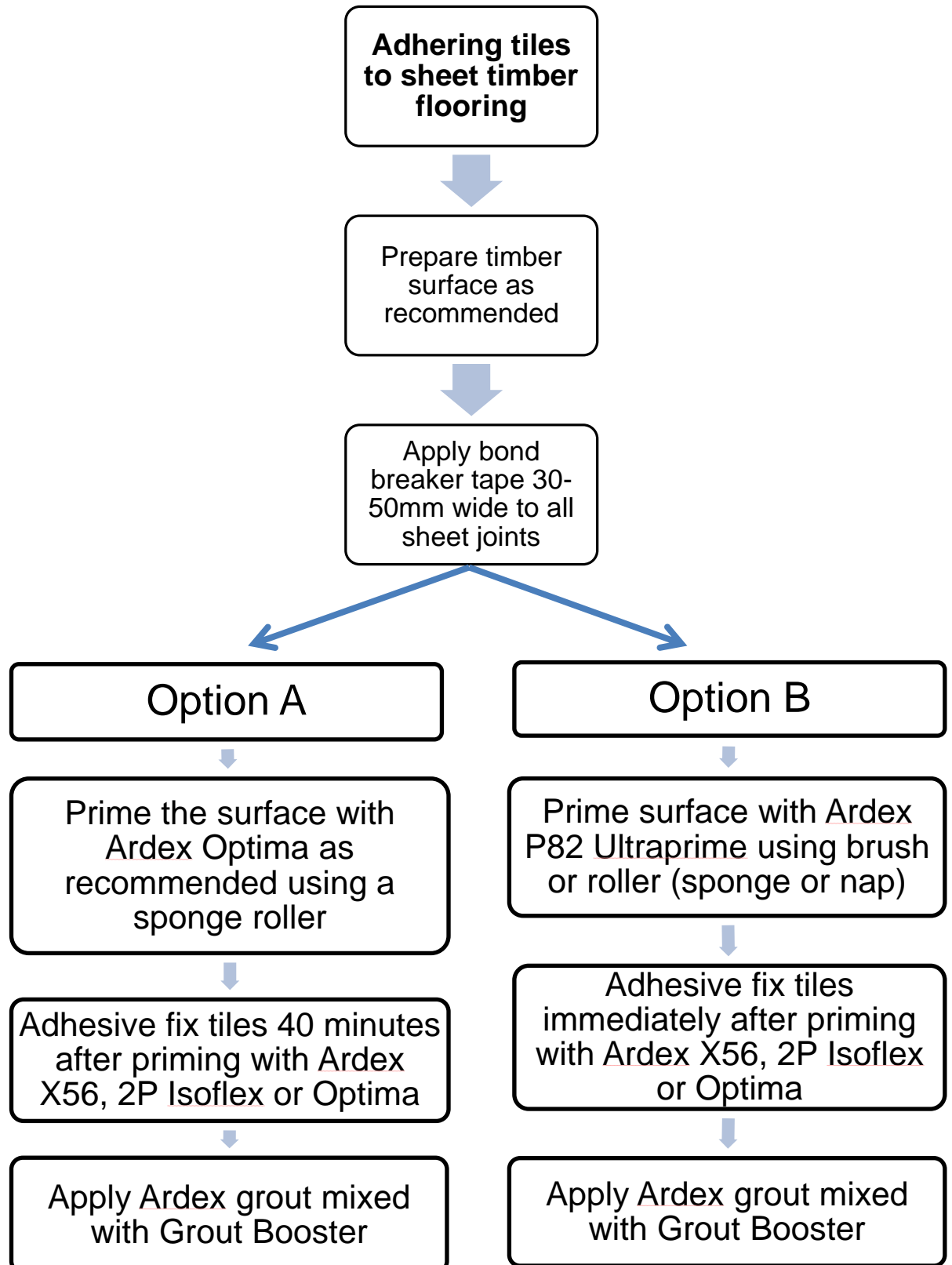
*ADHESIVE APPLICATION*

- Adhesive application and final tile placement shall be done to ensure a continuous unbroken 2.5mm **minimum** bed of adhesive under each tile. This can be accomplished by applying the adhesive with a 12 mm notch trowel held at 60° angle to the horizontal (i.e. nearly vertical) which results in adhesive notch lines about 5-6mm



high. Then the tile is placed firmly and moved slightly sideways across the adhesive notch lines to fully bed the adhesive and remove any notch voids.

- 2) The achieved adhesive contact coverage to both the tile back and substrate are recommended to be >90%, but in all cases must exceed the recommended minimum in AS3958 of >80% coverage for floors in residential situations and >85% for light commercial applications.



**COVERAGE**

<b>PRODUCT</b>	<b>PACK SIZE</b>	<b>COVERAGE (M<sup>2</sup>)</b>
Ardex Optima (as primer)	Mini Kit (1.7kg Liquid/5kg powder)	8
	Large Kit (10kg liquid/6x5kg powder)	48
Ardex P82 Primer	2 kilo pack (1kg Part A + 1 kg Part B)	10-20*
	8 Kilo Pack ( 4 kg Part A + 4 kg Part B)	40-80*
Ardex X56**	15 kg powder	8-10
Ardex Isoflex (2 part)**	10kg liquid + 2x20 kg powder	19-21
Ardex Optima**	Mini Kit (1.7kg Liquid/5kg powder)	1.2
	Large Kit (10kg liquid/6x5kg powder)	7

\*Depending on the surface texture of the substrate. \*\* On floors with 10mm notch trowel

**GROUT APPLICATIONS TO TILE JOINTS**

Grouting between the tiles shall be done with a modified C class grout mixed with Ardex Grout Booster (GB) to increase flexibility.

It also possible to use the R class grouts Ardex WA or Ardex Abapoxy, or the D class grout Ardex DG5.

<b>Grout Type (C)</b>	<b>Additive Ratio Booster : Water</b>	<b>Liquid Requirement per 20kg of Grout Powder</b>
Ardex FG8	80% GB / 20% Water	3.4-3.5 litres GB + 0.8-0.9 litres water
Ardex WJ50	100% GB	4 litres GB
Ardex FSDD	80% GB / 20% Water	4.8 litres GB + 1.2 litres water

**IMPORTANT**

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia Office.

**DISCLAIMER**

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

**REASON FOR REVISION - ISSUER**

Revision of TB168 to be in line with TB218.

**DOCUMENT REVIEW REQUIRED**

24 months from date of issue.

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